REMARKS

Applicants appreciate the Examiner's thorough examination of the subject application and request reconsideration of the subject application based on the foregoing amendments and the following remarks.

Claims 59-62 are pending in the subject application.

Claims 1-58 and 63 - 66 were previously canceled without prejudice.

Claims 59 - 62 stand rejected under 35 U.S.C. §103, 35 U.S.C. §112, first paragraph and/or 35 U.S.C. §112, second paragraph.

Claim 59 was amended to more distinctly claim Applicants' invention and to address the Examiner's non-art based rejections.

The amendments to the claims are supported by the originally filed disclosure.

35 U.S.C. 112, FIRST & SECOND PARAGRAPH REJECTIONS

Claim 59-62 stand rejected under 35 U.S.C. §112, first paragarph, because the subject application fails to provide a written description of the light emitting layer having a flat surface. These claims also stand rejected under 35 U.S.C. §112, second paragarph on the grounds that there are antecedent basis, indefiniteness and/or vagueness concerns with the identified claims. The Office Action further provides that claims 60-62 stand rejected because of their dependency from a rejected claim with an identified concern.

As suggested by the Examiner, claim 59 was amended so the phrase "in order to attain a flat surface of the light emitting layer" now reads as --in order to attain a flat as possible surface of the light emitting layer--.

In view of this amendment, Applicants thus believe that the areas of rejection under both of 35 U.S.C. §112, first paragarph and 35 U.S.C. §112, second paragarph are addressed in the above-described amendment.

It is respectfully submitted that for the foregoing reasons, claims 59-62 satisfy the requirements of 35 U.S.C. §112 first and second paragarphs and, thus, these claims are allowable.

35 U.S.C. §103 REJECTIONS

Claims 59-62 stand rejected under 35 U.S.C. §103 as being unpatentable over Seki et al (US Published Patent Application No. 2002/0067123; "Seki"); in view of Himeshima et al (US Published Patent Application No. 2001/009689; "Himeshima"); in view of Chang et al (US Published Patent Application 2002/0118251; "Chang"); in view of Hawkins et al (US Published Patent Application No. 2002/0130931; "Hawkins"); in view of Silverbrook (US Patent No. 6,284,147) and in view of Akahira et al (US Patent No. 6394578; "Aikhira").

Applicants respectfully traverse as discussed below. Because claim(s) was/were amended in the instant amendment, the following discussion refers to the language of the amended claim(s). However, only those amended features specifically relied upon to distinguish the claimed invention from the cited prior art shall be considered as being made to overcome the cited reference.

As to the assertion in the Office Action (see paragarph 10 on page 12 thereof) that the feature upon which Applicants relies (*i.e.*, the droplets are immediately dried) is not recited in the claims, Applicants provide the following comments/obersvation.

The feature or effect that "The droplets are immediately dried" is attained by "ejecting droplets of light emitting material ... from a nozzle of an inkjet apparatus ...the droplets … being 1 pl or less in amount" as set forth in claim 59. In this regard, Applicants also direct the Examiner's attention to the discussion on page 136, line 25 to page 137, line 10 of the specification, including the last paragraph in Example 5. Therefore, the limitation of "ejecting droplets of light emitting material from a nozzle of an inkjet apparatus ...the droplets ... being 1 pl or less in amount" as set forth in claim yields the feature or effect that "the droplets are immediately dried."

Claim 50 is directed to a method for forming a display element comprising the steps of: (a) preparing a substrate; (b) forming a first electrode on the substrate; (c) forming a barrier on the first electrode, between pixels having different colors, the barrier being provided for obtaining a clear contrast of the pixels adjacent to each other; (d) forming a light emitting layer by ejecting droplets of light emitting material from a nozzle of an inkjet apparatus onto the first electrode of a light emitting layer formation region bounded by said barrier, the droplets having a viscosity of 20 cPs or more and are 1 pl or less in amount, the nozzle having a nozzle diameter from Φ0.2 μm to Φ4 μm, the light emitting layer being formed while an electric field is generated between an electrode of the nozzle and a counter electrode positioned so as to face the electrode; and (e) forming a second electrode on the light emitting layer. In step (c), the barrier being formed so as to have a height lower than that of the light emitting layer and in step (d), the droplets are ejected plural times from the inkjet apparatus while shifting landing positions of the droplets in the light emitting layer forming region so that the droplets overlap to form two or more layers, in order to attain a flat or flat as possible surface of the light emitting layer.

The above-referenced Office Action (see pages 5-6 thereof) provides the following:

> "Seki et al is directed towards a method for forming an EL device for a display [0001]. The process for forming the device shown in figure 1 comprises: preparing a substrate 10 patterning a first electrode 11 onto the substrate, ***forming a barrier 12 between the pixels of the first electrode out of silica [0030], forming a light emitting layer 18 [0032] by ejecting droplets from an inkjet apparatus [0029] onto the first electrode between the barrier 12, so that the barrier is lower than the light emitting layer (both seen in Figure 1), and then forming a second electrode 19 (or 23) on the light emitting layer [0033] – [0034].*** *(Emphasis Added)*

The above referenced Office Action (see paragarph 9 on page 12 thereof) also provides the following:

> On pages 11-13, applicant's discusses being "somewhat confused" by the Examiner's reasoning on the relationship between the barrier layer and the light emitting layer and argues its validity. Applicant's point seems to be that Seki is deficient because the Examiner has not conclusively

> determined whether the barrier layer material of Seki is thinner than the light emitting layer.
>
> However, the claim does not require this limitation, only that "the barrier being formed so as to have a height lower than that of the light emitting layer". Since the light emitting layer of Seki is positioned higher than the barrier layer in the stack, it meets the claim limitation. Putting this another way, the 1st floor of a building (barrier layer) is formed so as to have a height lower than the 10th floor (light emitting layer). Thus the argument is not convincing.

It should be noted that the comments or discussion in paragarph 9 is inconsistent with the wording of claim 59 that includes "forming a light emitting layer by ejecting droplets of light emitting material from a nozzle of an inkjet apparatus onto the first electrode of a light emitting layer formation region ***between the barrier***" (*emphasis added).* If the light emitting material is being deposited "between the barrier", Applicants cannot see how a structure (such as that seerted in the Office Action) where the barrier is substantially wholly on a different level that the light emitting layer teaches, discloses or suggests the limitations of claim 59.

As to Seki, Applicants make the following observations, in Seki, the partitions 13 substantially provide areas where the hole injection/transportation layer 21 and the light emitting layer 22 are positioned. That is, it is considered that the partitions 13 correspond to a barrier of the present application. In the partitions 13, the light emitting layer 22 is positioned above the hole injection/transportation layer 21. The cathode 23 is positioned on the light emitting layer 22, and the hole injection/transportation layer 21 which is conductive is covered at its top surface with the light emitting layer 22 in order to prevent leak of an electric current (see Fig. 7, paragraphs [0030] and [0034]).

In the present invention, droplets overlap to form two or more layers in order to make a surface of the light emitting layer as flat as possible. In contrast thereto and as is evident from Fig. 7 of Seki, Seiki does not consider or contemplate making the light emitting layer 22 "as flat as possible." Further, Seki does not describe or have a technical idea of forming the light emitting layer "as flat as possible" with use of an inkjet apparatus.

In the present invention, the light emitting layer being "as flat as possible" is attained by the step (d) in claim 59 of forming a light emitting layer where droplets ejected from the nozzle are designed to dry immediately and the droplets are ejected in plural times while shifting landing positions of the droplets.

As discussed herein in connection with the 35 U.S.C. 112 rejections, in the claimed invention, droplets ejected from a nozzle can dry immediately. This is attained by "ejecting droplets of light emitting material ... from a nozzle of an inkjet apparatus ... the droplets ... being 1 pl or less in amount" as set forth in claim 59 (see page 136, line 25 to page 137, line 10 of the specification and the last paragraph in Example 5).

Claim 59 provides that the nozzle of the inkjet apparatus has a nozzle diameter from Φ0.2 μm to Φ4 μm. This improves the electrification efficiency of the droplet to carry out the ejection of the droplet stably (page 107, lines 14-20). It also is provided in claim 59 that the droplets ejected from the nozzle have a high viscosity of 20 cPs or more. It should be realized that a conventional inkjet apparatus would have difficulty to eject such droplets. Thus, the inkjet apparatus of the claimed, present invention can eject droplets with high viscosity (*i.e.*, high concentration (see also page 99, the paragraph below Table 6). The higher concentration of droplets attains less number of ejection of droplets, thereby increasing a production efficiency (see page 78, lines 13-22 of the specification).

Further, Seki makes it abundantly clear at Paragraphs [0028] to [0031] that the production of that device proceeds in a particularly specified manner. This is to say that, as discussed in paragraph [0034], leak currents are avoided by ensuring that the final configuration is such as that shown in Fig. 6 rather than that being shown in Fig. 7 (*i.e.*, the hole injection/transportation layer 21 is separated from the cathode 23 by the light emitting layer). Hence, the hole injection/transportation layer exceeds the height of the ***barrier portion*** corresponding to the SiO_2 material 12 at the edges but not by enough to reach the cathode 23. Also, the volume between the hole injection/transportation layer 21 and the cathode 23 is filled by the light emitting

material layer 22 that is contained substantially wholly within the volume defined by the upper laminate portion of the bank and ***in no case exceeds the height of the upper portion of the bank.***

From the foregoing and the above-referenced Office Action, it becomes clear that in the grounds for rejection the banks 13 of Seki are being artifically divided into its two component laminated parts (the SiO_2 material 12 and a portion disposed thereabove) so that these laminated parts are being considered separately. Furthermore, as Figure 6 of Seki reveals clearly, the height of even the lowermost laminated layer portion, the SiO_2 material 12 of the bank 13. is higher than at least part of the light emitting layer 18 (22) (the central bottom part thereof) contrary to the wording of present claim 59 in which it is provided that "in step (c), the barrier being formed so as to have a height lower than that of the light emitting layer,".

In sum, whether the hole injection/transportation film and light emitting material film are taken together or separately, the upper surface of the light emitting layer in Seki is lower in height than the adjacent barrier that defines the volume in which it is formed.

In view of this and as previously indicated by Applicants, Seiki describes an EL device in which at least two laminated films are formed by one or more ink jet systems, one film being a hole injection/transportation layer (a so-called "buffer" layer) and the other being a light emitting layer (the light-emitting layer being such as to completely cover the buffer layer, see paragraphs [0021], [0022], and [0034]. Further, as presently understood, paragraph [0004] of Seki clearly indicates that the buffer material cannot be characterized as being the same as, or equivalent to, the light emitting material.

As also previoulsy indicated by Applicants, in Seki the buffer or hole injection/transportation layer 16 is formed by droplets from an ink jet system and has an area or volume that is greater than or equal to **(not less than)** the area or volume defined by the so-called "barriers 12". See for example Figure 4 of Seki where the dried buffer layer 16 is clearly thicker than the adjacent SiO_2 material 12. Also, even if this were not the case, the combined buffer layer and light emitting material layer ***must*** overlap the top edge of the SiO_2 material 12 of the partition or bank 13, so as to avoid current leakage which appears to be the main point of Seki

(see Seki at Paragraph [0034]). Thus, the droplets of the buffer material are intended to overflow any barrier formed by the SiO_2 material 12 in order to prevent leakage currents flowing through the device, and even if they do not overflow any barrier formed by the SiO_2 material 12, the combined buffer and light emitting material layers are to do so.

Thus and as previoulsy indicated by Applicants, this is not a description, teaching or suggestion that the barrier walls do not have to be as thick as the light emitting material that they contain. Seki migth seem to suggest at least in the drawings that upon initial application the droplets deposited in the spaces between that barriers 13 whether they be of buffer material or light emitting material are thicker than the barriers 13 (overflow of the barriers 13 presumably being avoided by surface tension) prior to drying. However, the combined dried buffer material and dried light emitting material is not as thick as the adjacent barrier portion 12/13.

In additon, if the barrier is considered to be the SiO_2 material 12, then the buffer material is to be thicker than the barrier height. However, the buffer material is not the same as the claimed light emitting material as far as we have been able to understand from the present specification and Seki. On the other hand, if the element 13 or both the SiO_2 material 12 and 13 in Seki are considered to be the barrier, the barrier is always thicker than the ink jet deposited layer(s) adjacent thereto (not shorter than the same as set forth in claim 59) unless one is considering the droplets as deposited prior to the drying thereof.

It is respectfully submitted that for the foregoing reasons, claims 59-62 are patentable over the cited references and thus, satisfy the requirements of 35 U.S.C. 103. Therefore, these claims are allowable.

It is respectfully submitted that the subject application is in a condition for allowance. Early and favorable action is requested.

Applicants believe that additional fees are not required for consideration of the within Response. However, if for any reason a fee is required, a fee paid is inadequate or credit is owed for any excess fee paid, the Director is hereby authorized to charge any deficiency in the fees

filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 04-1105, under Order No. 63128 RCE (70904).

Respectfully submitted,
Edwards Angell Palmer & Dodge, LLP

/ William J. Daley, Jr. /

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